

Analysis of Non-Service Initialized (NSI) Cellular Calls to 911 in Massachusetts

Data for all Massachusetts 911 wireless calls received in a 19 month period (from 1/1/11 through 7/31/12) were analyzed by a team from the City of Cambridge¹ to understand the characteristics of calls from uninitialized phones (also called NSI or Non Service Initialized phones). NSI calls are 911 calls that appear with automatic number identification where the first 3 digits of the 10-digit “telephone number” are “911” and the following 7 digits are a set of numbers provided by the cellular carrier that may, for example, represent an internal code number associated with the calling handset – or some other value. The number cannot be called back by 911 operators.

Background on Massachusetts 911 Call Flow

Massachusetts historically has operated a “two-stage” cellular 911 call processing system. Three state police-operated wireless 911 call centers (at Framingham, Middleborough, and Northampton) serve the entire state and, up until recently², answered all 911 cell calls and either processed the call with no transfer, transferred the call to a state police station for dispatch, or transferred the call to one of over 260 primary municipal or regional PSAPs for dispatch.

Less than one-half of cellular 911 calls are transferred. State police wireless PSAP personnel report that many cellular 911 calls are “pocket dials”, misdials, informational requests, duplicates, or calls from NSI phones.

NSI calls were cited in particular as a problem, thus this analysis.

A. NSI calls are a big problem in Massachusetts

1. **14% of wireless calls made to 911 are NSI calls.** This is well over 400,000 911 calls in a 19 month period or almost 28,000 such calls a month!
2. Only 3% of NSI calls are transferred to either a primary PSAP or state police barrack for servicing/dispatch. **Thus almost all NSI calls are not real emergencies!**

¹ George Fosque, Cambridge 911 Director and Ken Pitts, Cambridge Public Safety IT Manager

² The City of Boston’s PSAP began taking wireless calls directly beginning in 2011.

Year	All Wireless 911 Calls	Calls with 911 area code: NSI calls	NSI Calls as a Percent of all 911 Wireless calls	NSI calls transferred to State Police stations or PSAPs	Percent of NSI Calls Transferred
2011 (Calendar)	1,970,925	276,307	14%	8,697	3.1%
2012 (Calendar, 1st 7 months)	1,078,501	136,697	13%	4,092	3.0%
Total	3,049,426	413,004	14%	12,789	3.1%
Average Number/Month	160,496	21,737	14%	673	3.1%

B. More than ½ of NSI calls have Phase 2 information but many (45%) have only Phase 1 information (cell tower and sector)

This table below shows that almost 55% of NSI calls present “Phase 2” Lat long information. It is not known whether this is accurate location information or an artifact of call routing and processing.

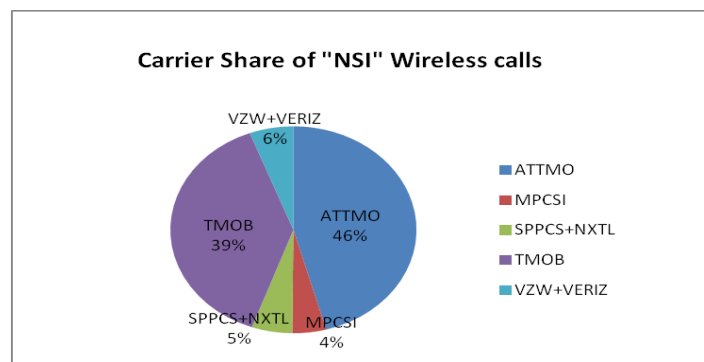
Class of Service	2011	2012	Total	Percent
MOBL	14	8	22	0.0%
WPH1	119,005	67,382	186,387	45.1%
WPH2	157,288	69,307	226,595	54.9%
Grand Total	276,307	136,697	413,004	100.0%

C. There are huge discrepancies in NSI calls received by carrier.

The “GSM” carriers (AT&T Mobility and T-Mobile) show large comparative rates of NSI calls whereas the “CDMA” carriers (Verizon Wireless and Sprint-Nextel) show much smaller rates.

Since there is no apparent reason why customers of one carrier versus another should have dramatically different rates in the generation of NSI calls, this finding suggests to the authors that many NSI calls are not actually calls placed by a person from an uninitialized phone, but rather are a result of various processing and routing “glitches” in mobile carrier handling of 911 cell calls.

Carrier	All cell 911 calls in 2011	All cell 911 calls in 1st 7 months of 2012	Total in the period (19 months)	Total NSI calls for the carrier (19 months)	% of carrier's calls that are NSI	Carrier NSI as % of statewide NSI calls
ATTMO	607,954	345,574	953,528	188,566	19.8%	45.7%
MPCSI	155,482	91,312	246,794	18,492	7.5%	4.5%
SPPCS+NXTL	275,406	148,340	423,746	22,063	5.2%	5.3%
TMOB	447,922	237,589	685,511	159,779	23.3%	38.7%
VZW+VERIZ	495,412	261,396	756,808	23,900	3.2%	5.8%
Total Major carriers	1,982,176	1,084,211	3,066,387	413,004	13.5%	100.0%
Other misc and unk calls	6,225	1,890	8,115			
Total Wireless in MA	1,988,401	1,086,101	3,074,502			



D. Almost 64% of NSI calls are one-time calls to 911

110,989 different NSI phone numbers “made” only 1 call to 911 in the 19 month study period. Another 14,304 different NSI numbers “made” 2 calls each in that same period.

Number of Times a particular ANI Called 911	Total Number of 911 Calls Made	Number of Separate ANI's that made calls	Percent of Total	Cumulative Percent	Comment
1	110,989	110,989	63.8%	63.8%	63.8% of NSI calls were one-time events from a particular number over a 19 month period
2	28,608	14,304	16.5%	80.3%	14,304 different numbers “made” 2 calls each
3	12,184	4,061	7.0%	87.3%	
4	6,441	1,610	3.7%	91.0%	
5	3,844	769	2.2%	93.2%	
6	2,531	422	1.5%	94.7%	
7	1,794	256	1.0%	95.7%	
8	1,269	159	0.7%	96.4%	1,269 NSI calls were received from 159 numbers, thus each number "made" 8 calls
9	940	104	0.5%	97.0%	

E. But many numbers showed up a large number of times as NSI calls

20 different numbers were seen to make 200 or more calls to 911 in the 18 month period. The top “offending” number, 9114529376 made 2,000 calls in the 19 month period. Another, special number, 9110000000, generated almost 1,000 calls in the period.

ANI	Count	Comment
9114529376	2000	This number “made” 2000 NSI calls
9110000000	968	This is likely some error condition...
9110651990	727	
9110733186	602	
9116235641	492	
9110666552	440	
9110363749	408	
9110049346	364	
9110263373	349	
9111984940	302	
9116933652	267	
9114464105	263	
9113229277	244	
9110691380	236	
9110391403	227	
9117858598	221	
9111265822	210	
9110264868	207	
9117622890	201	
9111238490	200	
9115759630	200	This number “made” 200 calls

Some other facts:

- 301 numbers were found to have 50 or more calls in the period
- 1,510 numbers were found to have 49 or less calls in the period

F. Only 12 of 968 calls from 9110000000 were transferred to a PSAP or State Police station/barrack

Thus almost none of these calls required dispatch service, but 12 may have.

Transfer locations for a particular number	NSI Calls	# Transferred to a Barrack or PSAP
Example: 9110000000	968	12
A-1 Andover	1	1
A-3 Concord	1	1
A-5 Revere	1	1
Boston EMS	2	2
Boston Police	2	2
Cumberland RI PD	1	1
E-1 Weston	1	1
Haverhill	1	1
Orleans Fire/EMS	1	1
Wayland	1	1
(blank)	956	Not transferred

G. An analysis of NSI calls in Cambridge showed few were emergencies

The Cambridge PSAP recorded 117 NSI calls in Calendar 2012 (all transfers from a state police wireless PSAP). A large sample of these calls were listened to and annotated below in detail. Some findings:

1. Several (reliable) callers were located and reported that they has used their normal cell phone (having a current post-paid contract with their carrier) and thus were not calling from an uninitialized phone.
2. Phones off-contract appear to have been used disproportionately by homeless and intoxicated persons to call 911 when there was no emergency.
3. Many times no one was on the line at all.
4. Sometimes there was no report of a call even being transferred by SP to Cambridge!
5. Only a handful of the 60 calls examined generated a dispatch. One was a person threatening to jump off a bridge; he was rescued.

Date	Calling Number	Cell Site	CCOS	Comment
6/8/2012	(911) 657-2822	1430 MASS AVE N SECTOR	SWPH2	111b calling in a noise complaint for a park
7/22/2012	(911) 648-4427	678 MASS. AVE E SECTOR	SWPH1	111b calling in for ambulance, not feeling well, Debra
6/25/2012	(911) 054-3332	678 MASS. AVE E SECTOR	SWPH2	111bs looking for ride to 240 Albany
7/11/2012	(911) 605-3000	1855 WASHINGTON ST W SECTOR	VWPH2	a hm calling in needed to use language line, rp was no longer on the line
3/31/2012	(911) 958-2647	330 MT AUBURN ST	FWPH2	Abandoned. No one on line to indicate transfer. Called State, they say no transfer
5/26/2012	(911) 963-9884	253 CAMBRIDGE ST	FWPH2	Abandoned. No one on line to indicate transfer. Nothing Further
2/22/2012	(911) 963-9884	253 CAMBRIDGE ST	FWPH2	Abandoned. State says no one transferred a call
2/22/2012	(911) 963-9884	253 CAMBRIDGE ST	FWPH2	Abandoned. State says no one transferred a call
7/27/2012	(911) 648-4427	678 MASS. AVE E SECTOR	SWPH2	Debra again. Diff Breathing.
5/9/2012	(911) 089-5950	0 NEWBURY & DARTMOUT OMNI	TWPH2	Don't know why this listed as a separate call. Ran 21:06-21:24
5/26/2012	(911) 054-3332	678 MASS. AVE E SECTOR	SWPH2	Duplicate
7/26/2012	(911) 648-4427	678 MASS. AVE E SECTOR	SWPH2	Hang-up
7/6/2012	(911) 432-2681	1350 MASSACHUSETTS AVE S SECTOR	AWPH2	male looking for a shelter for his pregnant girlfriend

3/31/2012	(911) 958-2647	330 MT AUBURN ST	FWPH2	No one on line to indicate transfer. Female mumbled and hung up. Nothing further
5/13/2012	(911) 790-9350	44 DANA ST	FWPH2	No one on the line to indicate transfer. Open line. Sounds like a pocket dial.
7/26/2012	(911) 648-4427	678 MASS. AVE E SECTOR	SWPH2	No one on the line to indicate who transferred. Intoxicated female in Central Square looking for the Van. Caller is Debra Parzych
7/10/2012	(911) 648-4427	678 MASS. AVE E SECTOR	SWPH1	No one on the line to indicate who transferred. Intox female in Central Square Medical call for vomiting
7/27/2012	(911) 648-4427	678 MASS. AVE NW SECTOR	SWPH1	No one on the line to indicate who transferred. Intoxicated female looking for ambulance. Debra Parzych
3/10/2012	(911) 027-3050	1350 MASSACHUSETTS AVE NE SECTOR	AWPH2	No one on the line to indicate who was transferring the call. 3rd party call for "man down" in the pit.
6/11/2012	(911) 013-5158	97 US-3 ST SE SECTOR	MWPH2	No one on the line to indicate who was transferring the call. Call from security at 364 Rindge Ave for a missing person/past assault. Rp gave a different callback number
5/26/2012	(911) 054-3332	678 MASS. AVE E SECTOR	SWPH1	No one on the line to indicate who was transferring the call. Male caller, sounded intoxicated, looking for an ambulance in central Square
2/17/2012	(911) 066-1004	40 UNION SQ S SECTOR	MWPH2	No one on the line to indicate who was transferring the call. Medical call. Uncooperative caller.
3/26/2012	(911) 014-3430	675 MASSACHUSETTS AVE NE SECTOR	AWPH2	No one on the line to indicate who was transferring the call. Medical call. The patient stated his phone had been shut off and we could not call it back
6/19/2012	(911) 054-3332	94 BEACON PL S SECTOR	SWPH2	No one on the line to indicate who was transferring the call. Same intoxicated male (Says the same thing each time)
6/19/2012	(911) 054-3332	94 BEACON PL S SECTOR	SWPH2	No one on the line to indicate who was transferring the call. Same intoxicated male. He called back while Ambulance/PD was looking for him
3/26/2012	(911) 014-3430	675 MASSACHUSETTS AVE NE SECTOR	AWPH2	No one on the line to indicate who was transferring the call. Callback for #12025644 correcting the address
1/21/2012	(911) 341-8340	1234 SOLDIERS FIELD RD NE SECTOR	AWPH2	No one on the line to say who transferred it. Female saying someone took her key and hung up. Only call in the cad was for a 911 hang up
1/14/2012	(911) 181-5017	4 MARION ST E SECTOR	MWPH2	No one on the line to say who transferred it. Call for a disturbance outside.

7/24/2012	(911) 051-6527	1221 CAMBRIDGE ST NE SECTOR	TWPH1	no one was on the line
7/6/2012	(911) 432-2681	1350 MASSACHUSETTS AVE S SECTOR	AWPH2	no transmissions for this call
7/11/2012	(911) 605-3000	1855 WASHINGTON ST W SECTOR	VWPH2	no transmissions for this call
6/8/2012	(911) 657-2822	1430 MASS AVE N SECTOR	SWPH2	rp is calling in a past assault, dogs w/o leashes
3/8/2012	(911) 074-4487	19 MYRTLE ST W SECTOR	TWPH2	rp was calling in a fight, after that we lost him
7/24/2012	(911) 051-6527	1221 CAMBRIDGE ST NE SECTOR	TWPH1	rp was calling in a power outage
6/25/2012	(911) 054-3332	678 MASS. AVE E SECTOR	SWPH1	same rp as above calling for a ride to shelter
6/9/2012	(911) 657-2822	1430 MASS AVE N SECTOR	SWPH2	same rp as above,111b
6/16/2012	(911) 054-3332	678 MASS. AVE S SECTOR	SWPH2	same rp as above,111b, he stayed on the line
7/22/2012	(911) 648-4427	678 MASS. AVE S SECTOR	SWPH2	same rp calling back looking for the ambulance
3/8/2012	(911) 074-4487	19 MYRTLE ST W SECTOR	TWPH2	state xfer, msp on line, same rp as above but we could not hear him
1/9/2012	(911) 732-8720	80 ERIE ST SE SECTOR	VWPH2	State transfer, intoxicatedmale rambling 17:09-17:13 caller speaks Spanish, Hector had the call. No Cad entry
6/13/2012	(911) 054-3332	678 MASS. AVE S SECTOR	SWPH2	State transfer, Same intoxicated male in Central Square. Name possible Tyrique
1/1/2012	(911) 732-8720	284 NORFOLK ST NE SECTOR	VWPH2	State Transfer. Intoxicatedmale rambling. Named Nelson?
4/12/2012	(911) 456-2734	599 MASSACHUSETTS AVE SW SECTOR	VWPH2	State transfer. Open Line, no one there. 16:18-16:21 talking map location with state. Call was re-bid
2/7/2012	(911) 795-7710	675 MASSACHUSETTS AVE W SECTOR	AWPH2	This was a call for a possible B&E, the rp is in the bldg
5/9/2012	(911) 089-5950	0 NEWBURY & DARTMOUT OMNI	TWPH2	Transfer from Boston. Psych call, jumper on the Harvard Bridge. Caller was the jumper. Liz answered the call. Caller spoke Spanish (17 minute call)
6/16/2012	(911) 054-3332	678 MASS. AVE S SECTOR	SWPH1	xfer from state, msp on line rp hung up, told msp he was "skitzo"
2/7/2012	(911) 795-7710	675 MASSACHUSETTS AVE NE SECTOR	AWPH2	xfer from state, msp on line. Same rp & complaint as above

Notations:	Msp – Massacushetts State Police
Rp – reporting party	Xfer – transfer
111b – public drunkenness	Hm – Hispanic male